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Susceptibility of *Streptococcus agalactiae* isolates from blood and urine to 18 widely used and recently marketed antibiotics

In a recent article in *Clinical Microbiology and Infection*, we reported the susceptibility of strains of *Streptococcus agalactiae* collected in 1997–99 to macrolides and lincosamides [1]. Subsequently, we have studied the susceptibilities of 145 strains of *S. agalactiae* collected in 1998–2002 to 18 widely used and recently marketed antibiotics. Most (115) of the strains were from urine samples in 2002 and were associated with asymptomatic bacteriuria in pregnant women or urinary tract infections in the non-gestating population, while the remaining 30 strains were from bacteraemias diagnosed in 1998–2002. The MIC of each antibiotic was determined by the agar dilution method, as described in our previous study [1]. The results obtained are shown in Table 1.

As in most published studies from other countries [2–4], the *S. agalactiae* isolates from Madrid were still susceptible to the β-lactam antibiotics tested. However, resistance to penicillin has been described elsewhere, albeit at a low frequency [5]. In contrast, a gradual increase in resistance to macrolides and lincosamides has been described in recent years [2–5], and resistance levels approaching 20% were found in the present study. These values were slightly higher than those described previously in Spain. Thus, in 1997–99, there were resistance levels in Madrid of 16% for erythromycin and azithromycin, and 13% for miocamycin and clindamycin [1]. Similarly, Betriu *et al.* [6] described a significant increase in resistance to macrolides and lincosamides over the period 1993–2001, with resistance levels nearing 17% for erythromycin and 12% for clindamycin. The high resistance level (83.5%) observed for tetracycline was similar to that reported in Canada and France [2,7], but was lower than the 26% resistance level reported in Japan [8]. All the *S. agalactiae* strains studied were susceptible to the new antibiotics tested, with MIC_{90}s of 0.12 mg/L for moxifloxacin, 0.06 mg/L for telithromycin, and 1 mg/L for linezolid.

In conclusion, *S. agalactiae* isolates from Madrid still appear to be susceptible to the β-lactams used in the treatment of infections caused by this species. However, levels of resistance to macrolides and lincosamides are now significant, and this fact must be considered by the physician when prescribing empirical treatment, and also by the microbiologist when testing in-vitro susceptibilities. The recently marketed antibiotics examined in the present study

Table 1. In-vitro susceptibility to 18 antibiotics of 145 *Streptococcus agalactiae* strains isolated from blood and urine

	MIC (mg[redacted]				
Antibiotic	**Range**	**MIC_{50}**	**MIC_{90}**	**% susceptibility**	**Breakpoint**
Penicillin G	≤ 0.3–0.12	0.06	0.12	100	≤ 0.12[a]
Ampicillin	0.06–0.12	0.12	0.12	100	≤ 0.25[a]
Cefotaxime	≤ 0.03–0.12	0.06	0.12	100	≤ 0.5[a]
Azithromycin	≤ 0.06–>16	≤ 0.06	> 16	78	≤ 0.5[a]
Erythromycin	≤ 0.06–>16	≤ 0.06	> 16	78	≤ 0.25[a]
Miocamycin	≤ 0.25–>16	0.5	> 16	80	≤ 1[b]
Clindamycin	≤ 0.06–>16	≤ 0.06	> 16	80	≤ 0.25[a]
Vancomycin	≤ 0.5	≤ 0.5	≤ 0.5	100	≤ 1[a]
Gentamicin	8–32	16	32	–	NA
Tetracycline	≤ 0.5–>16	> 16	> 16	16.5	≤ 2[a]
Rifampicin	≤ 0.12–1	≤ 0.12	0.5	100	≤1[c]
Fosfomycin	32 to >64	64	> 64	94	≤ 64[d]
Nitrofurantoin	≤ 8–>64	≤ 8	16	96	≤ 32[d]
Ciprofloxacin	0.25–2	0.5	1	–	NA
Moxifloxacin	≤ 0.03–0.25	0.12	0.12	100	≤ 1[c]
Levofloxacin	0.5–2	0.5	1	100	≤ 2[a]
Linezolid	≤ 0.5–2	1	1	100	≤2[a]
Telithromycin	≤ 0.03–1	≤ 0.03	0.06	–	NA

NA, not available.
[a]National Committee for Clinical Laboratory Standards (NCCLS) breakpoint for *Streptococcus* spp. other than *S. pneumoniae* [9].
[b]Societé Française de Microbiologie [10].
[c]NCCLS breakpoint for *S. pneumoniae* [9].
[d]NCCLS breakpoint for *Enterococcus* spp. [9].

currently show good in-vitro activity against *S. agalactiae*.

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